

SOME ASPECTS OF THE NATURAL HISTORY
OF THE RUBY TIGER MOTH,
PHRAGMATOBIA FULIGINOSA L. (LEP.: ARCTIIDAE)

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Some confusion still exists concerning the natural history of this insect, despite the fact that a reasonable account had been written at the turn of the century by Barrett (1892-1900). He wrote of its bivoltinism — May and June, and late July and August; the moth's habit of running over low herbage; flying in the sunshine and its nocturnal activity; the rapid development of some larvae to produce a summer generation of moths, while others complete their growth more slowly and then hibernate, pupating without further feeding in early Spring. Subsequent textbooks are less in accord with reality, particularly with regard to voltinism and time of appearance of the moth. South (1939) and Skinner (1984) state that the insect is mainly single brooded, with a partial second generation in July and August, and August and September respectively. Newman and Leeds (1913) curiously, for L. W. Newman lived in N. W. Kent, state that the moth is single brooded, emerging in late May and June, and Heath (1979) also states that the insect is mainly univoltine, flying in May and June, but with a small generation in September, rare in *borealis* Staud.

Fuliginosa has been attracted to my garden m.v. light at Dartford each year since 1969, except 1975, during July and August, the earliest date being July 10th in 1970 and the latest August 28th in 1972, a range of time that agrees well with that given for Kent by Chalmers-Hunt (1960-1981), and for N.E. Surrey by L. and K. Evans (1973), although Kent records include some for early September. No first brood *fuliginosa* have been seen at this m.v. light, although prior to 1960 I encountered odd specimens flying in the sunshine on Dartford Heath in late April and May.

The most interesting aspect concerning *fuliginosa* was, I believe, first described by Chalmers-Hunt (*loc. cit.*) in which he states "The moths of the second generation seem to be mainly, if not wholly, nocturnal by habit, whereas those of the spring brood are sun loving, and have not to my knowledge been observed to fly at night." Apparently confirming this observation, Goater (1974) writes "sometimes it is seen flying commonly by day, but more usually it appears at m.v. light. In my experience the summer brood is always the more abundant, but the April-May emergence is more often seen flying by day." However, there are records, though very few, of first brood *fuliginosa* being attracted to light, thus Tomlinson (*Ent. Rec.* 80:191) observed a specimen at light at Stanford-le-Hope, Essex, 17.4.1967, and de Worms (*Entom.* 68:100) states that

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in two nights' collecting in the Fens, 8.6.1948, a few *fuliginosa* came to light. Diurnal flight in the second brood in S.E. England is also rarely seen, but the one record that I have found is most interesting — Wheeler-Holohan (*Ent. Rec.* 91:281) writes that at Swanley, Kent, in late August 1972, he saw several *fuliginosa* at about 4.30pm with the number increasing within half an hour to some two hundred, all to have disappeared by 5.30pm.

Corley (*Ent. Gaz.* 35:76) notes that at Faringdon, Oxon., *fuliginosa* is moderately common from late July to early September, but is never seen in May and June, nor larvae in late June or July. He suggests that the moth is univoltine around Faringdon, and further suggests that there might be a mosaic of univoltine and bivoltine populations of this moth in England. I think the answer to the first question is that in Oxfordshire *fuliginosa* is bivoltine, the summer brood dominant and being seen at light, the spring brood overlooked due to its diurnal nature and the fact that the moth is not readily seen flying in the sunshine, nor does it take readily to flight. By analogy, as well as my own experience with the two broods of *fuliginosa* in Kent, I mention that I have not seen a female *Diaphora mendica* Clerck which also flies in the sunshine, since 1953, a moth most conspicuous on the wing, yet the males are common at my garden m.v. light, and have been frequent visitors to light on my excursions to Co. Clare.

In 1976 the last second brood specimen seen at the garden trap was present on July 17th; however two more specimens were attracted on September 20th of that hot summer. Doubtless, these were representatives of a small third brood which must occasionally occur here. A similar late example was observed by Crawford (*Ent. Rec.* 70 : 58) at Buxted, Sussex, 21.9.1957, a year with extraordinary high March temperatures (at Dartford the average monthly maximum for March was 58°F., the minimum 43°F), March, April and May were very dry, while June, July and August were warmer than usual, conditions suggesting an early first brood followed by an early second brood with conditions for larval development being near optimal.

In Kent it seems that *fuliginosa* is bivoltine, flying from mid-April to late May, and again in July, August and early September, this brood being the dominant one, but sometimes a small third generation may be developed in late September. The spring brood is essentially diurnal and the summer generation(s) nocturnal. Larvae appear to be frequently encountered in September and October before hibernation, and in the early Spring. However, larvae of the first brood have been found in July, these producing moths in August (Chalmers-Hunt, 1960-81).

Barrett had noted that a third generation of moths could be reared, these emerging in September, presumably in captivity and

not under natural conditions. Kept indoors without central heating or other methods of producing a high, even temperature, *fuliginosa* of Kent origin will produce successive generations throughout the Autumn. In 1984 a third brood was obtained in late September from an August female caught at Dartford, a fourth brood emerged in late October and a fifth in early December; losses were minimal and any tendency for the larvae to hibernate occurred in the last generation only, due no doubt to the lower temperatures prevailing in late Autumn. The larvae were fed on dandelion (*Taraxacum*), chickweed (*Stellaria media*) and goosegrass (*Galium aparine*). This propensity for producing successive generations is remarkable and unique among the native British Arctiidae, and probably among the native macro-lepidoptera.

To obtain an accurate picture of the voltinism and other aspects in the British Islands is exceedingly difficult, mainly due to the almost complete absence of detailed and informative local studies on the Lepidoptera. Thus there is no work corresponding to the excellent studies by Chalmers-Hunt and L. and K. Evans for Kent and N. E. Surrey respectively, except for the former's work dealing with the Isle of Man. One can therefore but quote one's own experiences and comb the pages of the entomological periodicals for information.

What of voltinism and flight period of *fuliginosa*, including *borealis*, elsewhere but S.E. England? The textbooks are reticent on the subject. I have heard that the moth is bivoltine in S.W. England, but I have only encountered the insect at light in August, and this commonly on the S. Devon coast. For northern England Leech (*Ent. Rec.* 75:37) has provided a most useful observation, of *fuliginosa* flying in the sunshine at Formby, Lancs., 22.4.1962, but for Ballavale, I.O.M. there are trap records for June 18th and August 7th, 1953, while a series of other records for the Isle of Man affirm that the insect is bivoltine on parts of that island, but information is too scant to determine its habits of flight. Duddington and Johnson (1983) state that the moth has been frequently recorded in Lincolnshire in May and June, but with no mention of flight habit; a record is given for Boston, 3.8.1968, a specimen at light — presumably an example of the second brood, although the authors do not mention the summer generation, but instead state that it is found in small numbers in the Autumn some years, yet give no evidence of this; unfortunately much of the contents of this work appear to be a complex blend of fact and fantasy, and autumn *fuliginosa* must come within the latter category until evidence is forthcoming. In N. England and the Isle of Man therefore it seems that the species is double brooded to some extent, but one might speculate that this might not be so at higher altitudes.

Despite numerous entomological forays into Scotland and a considerable volume of literature describing the results, *fuliginosa* has rarely received mention, except in the context of finding larvae, usually in April, but sometimes in September. However, the journals provide several interesting observations — Howard (*Ent. Rec.* 90:259) reports seeing two flying at 5pm at Glengarry, Inv., 16.6.1977, while de Worms (*Entom.* 93:159) notes the moth at light at Aviemore, 10.5.1959 in contrast to Luckens (*Ent. Rec.* 83:260) who observed *fuliginosa* there in 1970 flying in the afternoon sunshine. Lorimer (1983) emphasises that in the Orkney Islands the species is diurnal, never being seen at light, making this population unique in the British Isles in this respect, bearing in mind that *fuliginosa* is found in Scotland north of the Central Highlands, the Hebrides and over much of Ireland where the moth's habits of flight seem not to have been noted. During my visits to the Highlands in July, August and September, I have not seen *fuliginosa*, except as larvae, further confirming that in this region the insect is univoltine. However, I found the moth common at street lights at Moffat, Dumfriesshire, 1.8.1972, suggesting that it is bivoltine in southern Scotland. Despite the absence of a summer brood in the Highlands, a July emergence was readily obtained from eggs laid by a female I found at Carrbridge, Inv., in early June 1970; the larvae were reared indoors in Kent and all the moths resembled the parent *borealis*, contrary to the expectation suggested by B. Harper in Kettlewell(1973). In Ireland *fuliginosa* is bivoltine in the South-West, specimens in the National Collection bear witness that the species flies there in May and August; for the remainder of Ireland the position seems obscure.

It is well known that *fuliginosa* varies regionally to the extent that subspecies *borealis* Staud. prevails in Scotland, and that specimens from northern England are intermediate in appearance between those from Scotland and southern England — form *intermedia* Tutt; however, this form is also the prevailing one in Ireland, Wales and S.W. England, i.e. the melanistic trend is not determined simply by latitude, the westerly incidence perhaps being determined by humidity and lower summer temperatures. I possess specimens from Brixham and elsewhere on the south Devon coast, and all are of this form, and quite unlike any specimens I have encountered in S. E. England, where the insect is characterized by an increase in the area of pink on the hindwings and possessing a complete, often irregular, black marginal band — form *marginata* Tutt. More rarely this band is broken into spots — form *attenuata* Tutt, and the hindwings being almost completely pink. The most extreme example of this form I have taken was caught as far north as Walberswick, Suffolk. Recently, while examining specimens of *fuliginosa* in the National Collection I was surprised to come across a series of

borealis with unusually bright reddish forewings, and a most conspicuous flame coloured tornal area on the otherwise black hindwings, specimens quite distinct from normal *borealis*; these specimens were from the Orkney Islands.

So, contrary to the statements in the textbooks subsequent to Barrett, *fuliginosa* in southern England at least is bivoltine, the second brood being the dominant one. The first brood is essentially diurnal and the second brood nocturnal in this region, and there are indications that this is so elsewhere. In the Highlands of Scotland *borealis* is univoltine, it flies by day and is attracted to light at night. For much of Britain voltinism, the relative frequency of the moth in each brood and its habits of flight seem not to be known; this applies particularly to the Southern Uplands and Central Valley of Scotland, much of Ireland and the mountains of northern England.

Reliable information regarding the foodplant preferences of the larva is scarce. In 1907 South noted that it is very partial to dock, dandelion, golden rod (*Solidago*) and plantain; nearly eighty years later a textbook appears (Heath, 1979) in which the specified plants are dock, dandelion and golden rod – same plants (almost), in the same order! Curiously, Chalmers-Hunt for Kent lists heather, sorrel, *Lamium* and bramble – but only one larva in each case, *Senecio* and broom, and two instances of numerous larvae, these on garden lupin at Dartford in 1961 and *Ballota nigra* at Chilmington in 1963. In N. E. Surrey and Lincolnshire larvae have been noted on ragwort. Although both South (1907) and Heath (1979) refer to the fact that on moors the cocoon is frequently made among twigs of heather, neither suggests that the larva feeds on heather, which indeed it does. For the Orkney Islands Lorimer lists *Senecio* and *Plantago*.

A curious error in the description of the moth appeared in the textbook by Newman (1874) and is repeated in Heath (1979); I quote from the latter – “abdomen red, dorsal stripe and lateral spots black.” In fact the abdomen does not have a dorsal stripe, but a row of black spots, although in old dried up cabinet specimens there does appear to be a black stripe.

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TRIFURCULA BEIRNEI PUPLESIS, 1984 (*PALLIDELLA* SENSU AUCTT.) (LEP., NEPTICULIDAE) IN SOUTH HAMPSHIRE. — Recently Mr. S. N. A. Jacobs gave me a box of unidentified Nepticulidae which included a few taken by the late W. Fassnidge. Amongst the latter was a specimen of *T. beirnei* captured at Southampton on the 20th of August 1935. This seems to be the most recent British record. The species used to be taken, sometimes plentifully, in VCs 9, 14, 20, 36, 60 and 69 at the end of the last and in the first decade of the present century, but I know of no other subsequent record. "Southampton" is probably to be interpreted as the district rather than the city itself.

The life history is unknown, but the moth frequents grassy places where dyer's greenweed (*Genista tinctoria*) is growing. It occurs in late August and early September, and after a dusk flight rests quite conspicuously on the herbage.

The British population was misidentified as belonging to *T. pallidella* Zeller, 1845, which is an eastern European species. Puplesis bestowed the current name in honour of B. P. Beirne who is the author of *The male genitalia of the British Stigmellidae* (1945).

In spite of the lack of records, the species probably still occurs in Britain, and I would like to learn of any recent observations A. M. EMMET, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex, CB11 2AF.